Donlin Gold Project DEIS
Air Emissions and Water Discharges

The mine and milling processes would result in air emissions and water discharges that contain natural and human-caused contaminants. Some contaminants persist in the environment and can have adverse effects on plants, fish, wildlife, and people. Residents of the region have expressed concerns about releases of contaminants such as dust, mercury, and diesel fuel. As required by regulation, the proposed project includes many air and water quality management components. The Draft EIS provides in-depth analysis of potential effects, and addresses questions brought forward by local residents. Some key questions and findings are summarized here.

What are the current air quality conditions in the proposed project area?

Baseline monitoring shows that levels of air contaminants in the proposed project area do not exceed guidelines for health. In order to comply with the Clean Air Act, the Environmental Protection Agency (EPA) has established standards for measuring air and water quality, and identifying what emissions to air are subject to monitoring, reporting, and permits. Detailed information on baseline conditions for air quality can be found in the Draft EIS.

How would the project change air quality and affect the environment, people, and subsistence resources?

Project-related mining activities would release dust that contains contaminants present in rocks and ore, such as mercury and arsenic. The project would also emit gaseous pollutants, such as oxides of nitrogen, from running machinery like the mine trucks, milling equipment, and the power plant. Dust may increase contaminants in soil, while gaseous emissions can contribute to acid rain, and to the formation of ozone in the lower atmosphere, which can be harmful to human and animal health. Many of the gaseous emissions – such as oxides of nitrogen, carbon dioxide, and sulfur dioxide – are greenhouse gases, which contribute to global warming and climate disruption.

How would mercury be released during the mining process?

Mercury emissions would be released into the atmosphere as fugitive dust at the mine site during the operations phase from drilling, blasting, loading, ore crushing, wind erosion of exposed surfaces, and road use. A dust control plan would be in place to minimize these emissions.

Gaseous mercury emissions may be released to the air when minerals naturally containing mercury are exposed to the environment, for example, the tailings facility and mine pit walls. Gaseous mercury emissions may also be released to the air from water and tailings in the Tailings Storage Facility. Mercury in the Tailings Storage Facility would be stabilized by addition of a treatment reagent, resulting in a reduction of the rate of mercury emissions from that source.

Gaseous mercury that escapes from the ore would be captured at various points in the milling process as shown in the table below. Overall, the mercury abatement processes to be utilized are 99.6 percent efficient, and are proven technologies at current operating mines in Nevada. Donlin Gold estimates the mine would remove approximately 34,600 pounds of mercury per year from the gaseous waste streams. All captured mercury would be taken off-site for permanent storage.

Mercury Abatement Process	
Mercury Control Point	Mercury Removal Efficiency
Pressure oxidation	99.9%
Hot cure	99%
Electrowinning	99%
Retort	99%
Refinery furnace	99%
Carbon regeneration kiln	99%

Based on emissions estimates and dispersion modeling, mercury concentrations in air from dust and gaseous sources during mine operations are predicted to be:
- 1,000 times lower than EPA criteria at the mine site; and
- 4,000 times lower than EPA criteria at the community of Crooked Creek.

Summary of Conclusions for Air Quality

Expected air quality impacts were evaluated based on the results of dispersion modeling and emissions estimates. No emissions are expected to exceed air quality standards in Alternative 2 (Donlin Gold's proposed action). Air quality effects during construction and closure would be considered temporary, while operations impacts would be long-term. During construction and closure, air quality impacts would be below permitting thresholds, so are considered low intensity. During operations, emissions would be high enough to trigger the need for air permits but would meet regulatory ambient air standards.

Under Alternatives 3A, 3B, and 4, barging would be reduced compared to Alternative 2 and there would be a corresponding reduction in air emissions from barging. Under Alternative 3B, diesel would be consumed instead of natural gas, resulting in more gaseous emissions at the mine site than for Alternative 2.

Alternative 5A (Dry Stack Tailings) would call for increased power generation, resulting in an increase in emissions from the power plant. It would require a 6 percent increase in barge traffic, and would create more fugitive dust than Alternative 2. None of these changes affect the overall magnitude of air quality impacts. The summary impacts of all action alternatives for air quality would be minor.

What are the current water quality conditions in the proposed project area?

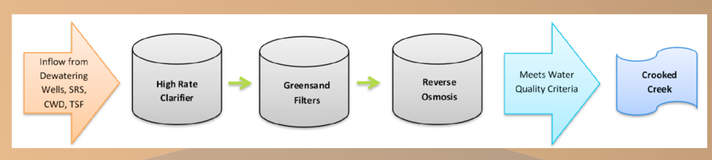
In order to comply with the Clean Water Act, the Environmental Protection Agency (EPA) has established standards for measuring water quality. Extensive sampling of groundwater and surface water has been performed. Most locations showed that water quality met water quality standards; however, there were several locations within the project area where naturally occurring elements, such as mercury and arsenic, in groundwater or surface water exceed the most stringent standard for drinking water. Detailed information on baseline conditions for water quality can be found in the Draft EIS.

How would the project change water quality and affect the environment, people, and subsistence resources?

There are two elements of particular concern that are potentially present at the mine site at concentrations that exceed the standards for surface water, groundwater, and sediment quality: mercury and arsenic. Mercury deposition from air emissions could enter surface water and cause slight exceedances of water quality standards. Rain and snowmelt would seep through disturbed rock; some would infiltrate shallow groundwater. Although affected groundwater would be captured and treated before discharge, some would contact shallow groundwater, resulting in localized, high-intensity effects within the mine footprint.

More than 90 percent of water used during various mine activities would be recycled for use in the process plant. The rest would be treated and discharged to Crooked Creek using the process illustrated in the figure below. Treated water discharged during operations would meet permit standards.

Water Treatment Plant



Summary of Conclusions for Water Quality

Effects outside the immediate mine area would be expected to be low intensity. Construction of the pipeline would create localized surface water and sediment effects at stream crossings. Surface water in the American and Anaconda Creek watersheds would be influenced by the creation and long-term maintenance of managed industrial facilities. Impacts at the mine site would be minor to moderate for most action alternatives.

- Surface water quality could be locally affected within the mine site, but would meet standards following water treatment prior to discharge.
- Operations would cause localized, high-intensity effects on groundwater quality at the mine site, which would be contained by the cone of depression around the pit, and would not reach the environment outside of the mine (see the Water Flow poster).
- Operations could cause low intensity increase of mercury in sediment above baseline (about 1 percent increase) near the mine.

As a whole, the impacts on water quality associated with the proposed project would be minor for all action alternatives.

What would be the environmental effects of contaminants building up over time?

Generally, the impact and persistence of contaminants in the environment depends on the type of material that enters water, soil, or air; the concentration; and natural conditions that dilute or degrade the material. As an example, dust from the mine site will contain arsenic, naturally found in the rocks and ore, and will cause the total amount of arsenic in the top inch of soil to increase over the 27-year life of the mine. It may increase a maximum of 5 percent over baseline – too low to impact humans or wildlife.

Some gaseous mercury will be emitted from the mill. Most will be dispersed in the atmosphere and move out of the area, but some will deposit near the mine site. How it changes over time will depend on dilution, dispersion, volatilization, and microbial activity. Studies estimate this would raise the concentration of mercury in surface water, soil, and wetlands very slightly, but concentrations would remain below levels that could harm humans, fish, plants, or animals.

Some potential contaminants and their environmental effects over time are specified in the Spill Risk section of the Draft EIS and on the Spill Risk poster.

Note: This topic poster is designed to give a general overview. More information on Contaminants can be found in the Draft EIS, Section 3.7 – Water Quality and Section 3.8 – Air Quality

Village of Crooked Creek
Native Village of Napaimute
Native Village of Chuathbaluk

Native Village of Aniak
Knik Tribe
Akiak Native Community

Photos: Dave Cannon